Module 2 - To Err is Human

ME3023 - Measurements in Mechanical Systems

June 02, 2020

Topic 1 - Accuracy and Error

Topic 1 - Accuracy and Error

- Thought Experiment
- Accuracy and Error
- Estimating Error
- Uncertainty Interval

Thought Experiment

Thought Experiment: Look around the room and choose an object. It can be anything. Ask yourself the following questions.

- What is the **true** length of the object?
- How can you find the **true** value? Can you measure it?
- ...

Image: T.Hill

Accuracy and Error

The exact value of a variable is called the _____. The value of the variables as indicated by a measurement system is called the _____ _____. The_____of a measurement refers to the closeness of agreement between the measured value and the true value. But the_____ _____is rarely known _____, and various influences, called_____, have an effect on both of these values. So the concept of the _____of a measurement is a *qualitative* one.

$$error =$$

Text: Theory and Design of Mech. Meas.

Estimating Error

The **true value** can be estimated but cannot be known *exactly*. In practice a reference value is used in place of the true value. We will discuss this again the the *Calibration Module*.

$$accuracy =$$

An estimate of error based using this value is sometimes referred to as _____.

Uncertainty Interval

"The _____is a numerical estimate of the possible range of the error in a measurement. In any measurement, the_____is not known exactly since the true value is rarely known exactly. But based on available information, the operator might feel confident that the error is within certain bounds, a plus or minus range of the indicated reading. This is the assigned _____."

We will discuss this again the the *Uncertainty Module*.

Text: Theory and Design of Mech. Meas.